# PNP POWER TRANSISTORS

## COMPLEMENTARY TO THE TIP29 SERIES

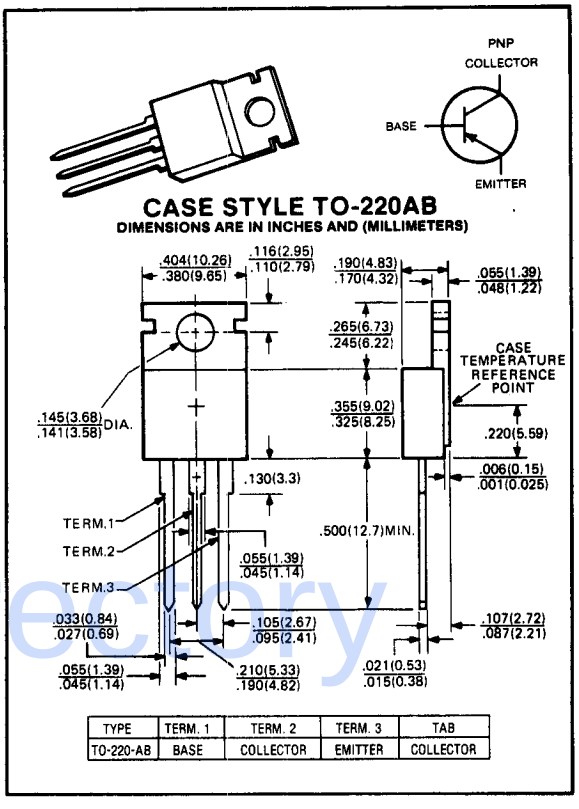
**TIP 30 Series**

**-40 ~ -100 VOLTS**
**-1 AMP, 30 WATTS**

The TIP30 Series power transistors are designed for use in general purpose amplifier and switching applications.

**Features:**

- Designed for complementary use with TIP29 series
- 30W at 25°C case temperature
- -1A continuous collector current
- -3A peak collector current
- Minimum $f_T$ of 3 MHz at 10V, 0.02A
- Customer-specified selections available
- Designed for power amplifier and high-speed switching applications




| TYPE | TERM. 1 | TERM. 2 | TERM. 3 | TAB |
|---|---|---|---|---|
| TO-220-AB | BASE | COLLECTOR | EMITTER | COLLECTOR |



## maximum ratings ($T_C$ = 25°C) (unless otherwise noted)

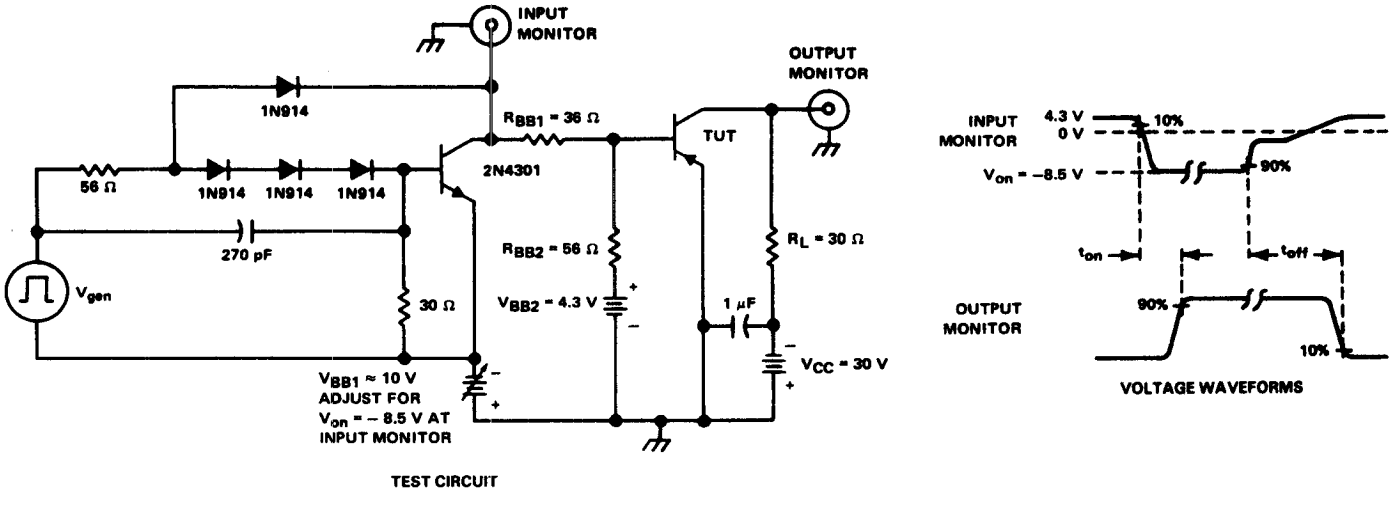
| RATING | SYMBOL | TIP30 | TIP30A | TIP30B | TIP30C | UNITS |
|---|---|---|---|---|---|---|
| Collector-Emitter Voltage | $V_{CEO}$ | -40 | -60 | -80 | -100 | Volts |
| Collector-Base Voltage | $V_{CBO}$ | -80 | -100 | -120 | -140 | Volts |
| Emitter Base Voltage | $V_{EBO}$ | -5 | -5 | -5 | -5 | Volts |
| Collector Current — Continuous<br>Peak | $I_C$<br>$I_{CM}$ | -1<br>-3 | -1<br>-3 | -1<br>-3 | -1<br>-3 | A |
| Base Current — Continuous | $I_B$ | -0.4 | -0.4 | -0.4 | -0.4 | A |
| Total Power Dissipation @ $T_A$ = 25°C<br>@ $T_C$ = 25°C | $P_D$ | 2<br>30 | 2<br>30 | 2<br>30 | 2<br>30 | Watts |
| Operating and Storage Junction Temperature Range | $T_J$, $T_{STG}$ | -65 to +150 | -65 to +150 | -65 to +150 | -65 to +150 | °C |

## thermal characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | 4.17 | 4.17 | 4.17 | 4.17 | °C/W |
| Maximum Lead Temperature for Soldering Purposes: ⅛" from Case for 5 Seconds | $T_L$ | 250 | 250 | 250 | 250 | °C |

## electrical characteristics ($T_C$ = 25°C) (unless otherwise specified)

| CHARACTERISTIC | | SYMBOL | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| **off characteristics** | | | | | | |
| Collector-Emitter Breakdown Voltage ($I_C$ = -30mA) | TIP30 | $V_{CEO}$ | -40 | — | — | Volts |
| | TIP30A | | -60 | — | — | |
| | TIP30B | | -80 | — | — | |
| | TIP30C | | -100 | — | — | |
| Collector Cutoff Current | | $I_{CEO}$ | | | | |
| ($V_{CE}$ = -30V) | TIP30, TIP30A | | — | — | -0.3 | mA |
| ($V_{CE}$ = -60V) | TIP30B, TIP30C | | — | — | -0.3 | |
| Collector Cutoff Current | | $I_{CES}$ | | | | |
| ($V_{CE}$ = -80V) | TIP30 | | — | — | -0.2 | mA |
| ($V_{CE}$ = -100V) | TIP30A | | — | — | -0.2 | |
| ($V_{CE}$ = -120V) | TIP30B | | — | — | -0.2 | |
| ($V_{CE}$ = -140V) | TIP30C | | — | — | -0.2 | |
| Emitter Cutoff Current ($V_{EB}$ = -5V, $I_C$ = 0) | | $I_{EBO}$ | — | — | -1 | mA |
| **second breakdown** | | | | | | |
| Second Breakdown with Base Forward Biased | | FBSOA | SEE FIGURE 3 | | | |
| **on characteristics** | | | | | | |
| DC Current Gain | | $h_{FE}$ | | | | — |
| ($I_C$ = -0.2A, $V_{CE}$ = -4V) | | | 20 | — | — | |
| ($I_C$ = 1A, $V_{CE}$ = 4V) | | | 15 | — | 75 | |
| Collector-Emitter Saturation Voltage ($I_C$ = -1A, $I_B$ = -125mA) | | $V_{CE(sat)}$ | — | — | -0.7 | V |
| Base-Emitter Voltage ($I_C$ = -1A, $V_{CE}$ = -4V) | | $V_{BE(on)}$ | — | — | -1.3 | V |
| **switching characteristics** | | | | | | |
| Turn-on Time | $R_L$ = 30Ω, $I_C$ = -1A, $I_{B1}$ = $I_{B2}$ = 0.1A, $V_{BE(off)}$ = 4.3V | $t_{on}$ | — | 0.3 | — | μs |
| Turn-off Time | | $t_{off}$ | — | 1 | — | |




NOTES: A. $V_{gen}$ is a 30-V pulse into a 50 Ω termination.
B. The $V_{gen}$ waveform is supplied by the following characteristics: $t_r \leq 15$ ns, $t_f \leq 15$ ns, $Z_{out}$ = 50 Ω, $t_w$ = 20 μs, duty cycle ≤ 2%.
C. Waveforms are monitored on an oscilloscope with the following characteristics: $t_r \leq 15$ ns, $R_{in} \geq 10$ MΩ, $C_{in} \leq 11.5$ pF.
D. Resistors must be noninductive types.
E. The d-c power supplies may require additional bypassing in order to minimize ringing.

**FIGURE 1. RESISTIVE-LOAD SWITCHING**

STATIC FORWARD CURRENT TRANSFER RATIO
vs
COLLECTOR CURRENT

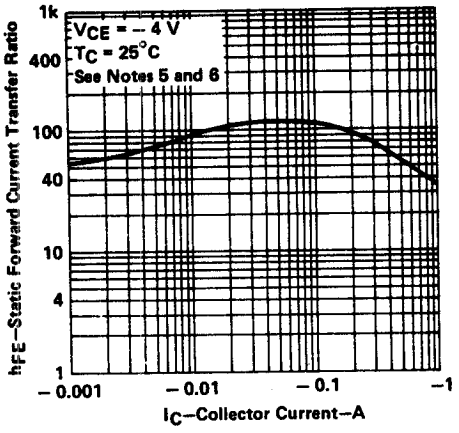



**FIGURE 2. TYPICAL CHARACTERISTICS**

NOTES: 5. These parameters must be measured using pulse techniques, $t_w$ = 300 μs, duty cycle ≤ 2%.
6. These parameters are measured with voltage-sensing contacts separate from the current-carrying contacts.

FORWARD-BIAS SAFE OPERATING AREA

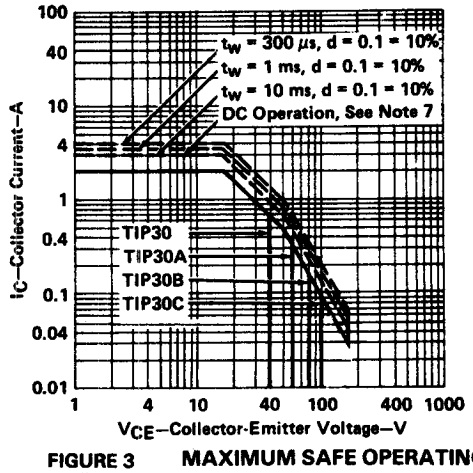



**FIGURE 3 MAXIMUM SAFE OPERATING AREA**

NOTE 7: This combination of maximum voltage and current values may be achieved only when switching from saturation to cutoff with a clamped inductive load.

DISSIPATION DERATING CURVE

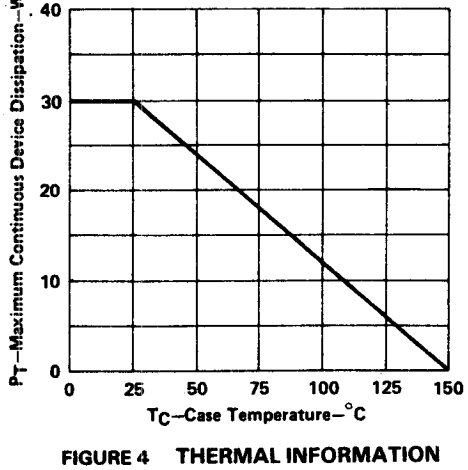



**FIGURE 4 THERMAL INFORMATION**